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TECHNICAL NOTES

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ROCKY MOUNTAIN STATION

No. 39

JUNEAU, ALASKA

The Effect of Logging on Discharge, Temperature, and Sedimentation of a Salmon Stream

Logging has been in progress on the Maybeso Creek^{1/} watershed since August 1953, and to date about 60 percent of the merchantable timber has been felled. Enough data have been collected to permit a preliminary analysis of the effect of logging on a few measured factors.

STREAMFLOW

Mean monthly discharge and stream level on Maybeso Creek were almost identical between the prelogging period and the first 3 years of transition from unlogged to a clearcut watershed. As precipitation averaged 10 inches less per season (May through October) during the transition period, there should have been a slight change in discharge and stream level due to this factor. Harris River, totally unlogged and adjacent to the Maybeso Creek watershed, did reflect this reduced precipitation (table 1).

Table 1.--Mean monthly discharge and stream level at gage stations on
Maybeso Creek and Harris River

Month	Pre-logging period				Transition period			
	Discharge*		Stream Level*		Discharge		Stream Level	
	Maybeso Ck.	Harris R.	Maybeso Ck.	Harris R.	Maybeso Ck.	Harris R.	Maybeso Ck.	Harris R.
May	15.4	12.8	2.08	2.49	16.8	13.7	2.10	2.47
June	11.5	9.5	1.84	2.18	11.4	8.7	1.86	2.11
July	6.1	5.3	1.39	1.63	5.4	3.8	1.36	1.42
Aug.	5.3	5.3	1.26	1.52	7.7	6.0	1.41	1.56
Sept.	11.0	10.0	1.64	1.98	6.8	5.8	1.38	1.59
Oct.	18.0	16.0	2.07	2.53	18.6	16.3	2.11	2.52
Average	11.2	9.8	1.71	2.05	11.1	9.0	1.70	1.94

* Discharge - inches per square mile
Stream level - feet and tenths

The slightly higher rate of runoff from Maybeso Creek during July and August is better shown in table 2. It can be seen that in June, with the transpiration rate reduced by cutting of the stand, Maybeso Creek begins to show a slightly greater increase in runoff. Discharge differences increased between the two streams during July and August. In September, as growth ceases, the two streams show little difference.

^{1/} One of 5 streams being studied to determine the effect of logging on salmon streams of Southeast Alaska. (James, G. A. The physical effect of logging on salmon streams of Southeast Alaska. Sta. Paper No. 5, Alaska Forest Research Center, 49 pp., illus., 1956.)

The increase in stream discharge in Maybeso Creek is small. It does occur, however, during the months when two or three weeks of dry weather, called a drought by Southeast Alaskans, is apt to occur. This may be beneficial to silver salmon fry, and to late-migrating pink and chum fry. Higher water levels might also help early spawning salmon to escape upstream.

Table 2.--Relationship between mean monthly precipitation and stream runoff, Maybeso Creek and Harris River

Month	Runoff as percent of precipitation*				Change in percent		
	Prelogging period		Transition period				
	Maybeso Ck.	Harris R.	Maybeso Ck.	Harris R.	Maybeso Ck.	Harris R.	
May	348	290	316	257	- 9.2	-11.4	
June	374	309	381	291	+ 1.9	- 5.8	
July	170	148	290	204	+70.6	+37.8	
Aug.	95	95	138	108	+45.3	+13.7	
Sept.	100	91	111	95	+11.0	+ 4.4	
Oct.	88	79	115	101	+30.7	+27.8	

* Runoff in inches per square mile, and precipitation in inches.

Stream Temperature

Stream temperature differences were very slight between the prelogging and the transition periods in all test streams. Maybeso Creek shows no temperature variation from the unlogged watersheds. In fact, Maybeso Creek averaged approximately 1° F. cooler after logging than before. A comparison between this stream and Harris River reveals that logging to date has not changed the temperature regime of Maybeso Creek.

Sedimentation

Suspended sediment samples collected during spring, summer and fall of 1956 show very low sediment concentrations in all study streams. A flood stage of 4.82 feet on Maybeso Creek resulted in a sediment concentration of only 11 ppm. Sediment production in Maybeso Creek after 3 years of logging has not been any greater than in any of the unlogged study streams.

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March 1957

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